

## **REMARKS/ARGUMENTS**

Applicant thanks Examiner for the detailed Office Action dated March 13, 2006. In response to the issues raised, the Applicant offers the following submissions and amendments.

### **Amendments**

Independent claims 1, 19 and 38 have been amended to highlight the features distinguishing them from the cited art. As a result of these amendments, claims 2, 20 and 39 have been cancelled.

Claims 18 and 37 have also been amended to address the antecedent issue identified by the Examiner.

Accordingly the amendments do not add new matter.

### **Claims – 35USC§102**

Claims 1, 19 and 38 *inter alia* stand rejected for lack of novelty in light of US 6,019,457 to Silverbrook. To better distinguish the invention, independent claims 1, 19 and 38 have been amended to emphasize the invention's use of designated bubble nucleation sites on the heater element.

The amended claims define that the invention has a heater with two bubble nucleation regions in the chamber. The nucleation regions are laterally offset from the central axis of the nozzle, each region being offset an equal and opposite distance to each other. However, the nucleation regions are also close enough that their respective nucleating bubbles grow until they merge into one and eject the liquid. A single heater element with controlled bubble nucleation on either side of the central axis generates a broad bubble that shapes the pressure pulse so that droplet misdirection is reduced. Powering both nucleation region from the same electrodes means that the electrodes can be bigger without affecting the nozzle packing density. Having large common electrodes for both nucleation regions is easier to deposit and creates less resistive losses in the electrodes than separate electrodes for each nucleation region.

The '457 reference does not disclose this combination of features. The heaters shown in Figures 10 and 13 of the citation have two separate heater elements powered by separate pairs of electrodes. This is because the '457 printhead has a redundant heater for each nozzle. The second heater is essentially a spare that can be used in the event that the first heater fails. This is directed to improving the yield of workable nozzles from the wafers on which the nozzles are fabricated. The nozzles shown in Figure 23 to 31 of '457 are generating two or more bubbles simultaneously but the heaters are not close enough to let the separate bubbles unite into a single bubble that creates a broad pressure pulse directed parallel to the central axis to minimize any drop misdirection.

In light of the above, '457 fails to anticipate amended claims 1, 19 and 38. It follows that the dependent claims are likewise novel.

### **Claims – 35USC§103**

Dependent claims 3, 21 and 40 stand rejected as obvious in light of '457 in view of US 6,680,668 to Gerber et al. Dependent claims 4, 7, 15, 16, 18, 22, 26, 34, 35, 37, 41, 51, 52, and

54 stand rejected as obvious in light of '457 in view of US 6,502,925 to Anagnostopoulos et al. Dependent claims 12, 31 and 48 stand rejected as obvious in light of '457 in view of US 4,870,433 to Cambell et al. Dependent claims 9, 28 and 45 stand rejected as obvious in light of '457 alone.

As discussed above, '457 fails to teach or suggest all the claim elements of the amended independent claims 1, 19 and 38, and therefore does not disclose all the features of any dependent claims. The additional references cited under §103 also fail to teach a single heater with two nucleation regions that generate a single bubble. Accordingly, '457 alone or in combination with any of the additional references, fails to anticipate any of the claims.

It is respectfully submitted that the Examiner's rejections have been successfully traversed. Accordingly, favorable reconsideration is courteously solicited.

Very respectfully,  
Applicants:



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